



**United States
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**Agricultural
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Vegetable
Division**

**Processed
Products
Branch**

United States Standards for Grades of Frozen Asparagus

Effective date June 30, 1974

This is the fourth issue, as amended, of the United States Standards for Grades of Frozen Asparagus published in the **FEDERAL REGISTER** OF May 15, 1974 (39 FR 17303) to become effective June 30, 1974. This issue supersedes the fourth issue, which has been in effect since April 8, 1970

Voluntary U.S. grade standards are issued under the authority of the Agricultural Marketing Act of 1946, which provides for the development of official U.S. grades to designate different levels of quality. These grade standards are available for use by producers, suppliers, buyers, and consumers. As in the case of other standards for grades of processed fruits and vegetables, these standards are designed to facilitate orderly marketing by providing a convenient basis for buying and selling, for establishing quality control programs, and for determining loan values.

The standards also serve as a basis for the inspection and grading of commodities by the Federal inspection service, the only activity authorized to approve the designation of U.S. grades as referenced in the standards, as provided under the Agricultural Marketing Act of 1946. This service, available as on-line (in-plant) or lot inspection and grading of all processed fruit and vegetable products, is offered to interested parties, upon application, on a fee-for-service basis. The verification of some specific recommendations, requirements, or tolerances contained in the standards can be accomplished only by the use of on-line inspection procedures. In all instances, a grade can be assigned based on final product factors or characteristics.

In addition to the U.S. grade standards, grading manuals or instructions for inspection of several processed fruits and vegetables are available upon request for a nominal fee. These manuals or instructions contain detailed interpretations of the grade standards and provide step-by-step procedures for grading the product.

Grade standards are issued by the Department after careful consideration of all data and views submitted, and the Department welcomes suggestions which might aid in improving the standards in future revisions. Comments may be submitted to, and copies of standards and grading manuals obtained from:

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United States Standards for Grades of Frozen Asparagus

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Authority:	Agricultural Marketing Act of 1946, Secs. 203, 205, 60 Stat. 1087, as amended, 1090, as amended (7 U.S.C. 1622, 1624).

Note: Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act, or with applicable State laws and regulations.

§52.381 Product description.

Frozen asparagus consists of sound and succulent fresh shoots of the asparagus plant (*Asparagus officinalis*). The product is prepared by sorting, trimming, washing, and blanching as necessary to assure a clean and wholesome product. It is then frozen and stored at temperatures necessary for preservation.

§52.382 Types.

- (a) **Green** or **all-green** consists of units of frozen asparagus which are typical green, light-green, or purplish-green in color.
- (b) **Green-white** consists of frozen asparagus spears and tips which have typical green, light-green, or purplish-green color to some extent but which are white in the lower portions of stalk.

§52.383 Styles.

- (a) **Spears** or **stalks** style consists of units composed of the head and adjoining portion of the shoot that are 3 inches or more in length.
- (b) **Tips** style consists of units composed of the head and adjoining portion of the shoot that are less than 3 inches in length.
- (c) **Cut spears** or **cuts and tips** style consists of the head and portions of the shoot cut transversely into units 2 inches or less but not less than one-half inch in length. To be considered of this style head material shall be present in these amounts for the respective lengths of cuts:
 - (1) **1-1/4 inches or less.** Not less than 18 percent (average), by count, of all cuts are head material.
 - (2) **Longer than 1-1/4 inches.** Not less than 25 percent (average), by count, of all cuts are head material.
- (d) **Center cuts** or **cuts** style consists of portions of shoots (with or without head material) that are cut transversely into units not less than one-half inch in length and that fail to meet the definition for **cut spears or cuts and tips** style.

§52.384 Definitions of terms.

- (a) **Absolute limit (AL).** Limit for maximum number of defects permitted in a sample unit.
- (b) **Acceptable Quality Level (AQL):** Acceptable Quality Level (AQL) is the maximum percent defective, or the maximum number of defects per hundred units, that, for purposes of sampling inspection, can be considered satisfactory as a process average.
- (c) **Defects.** Any specifically defined variation from a particular requirement. Defects are classified as **minor, major, severe, or critical.**
- (d) **Head.** In **cut spears** or **cuts and tips** style means:
 - (1) A tip end which is three-eighths inch or more in length; or
 - (2) An upper portion of a shoot which possesses a substantial amount of compact head material.
- (e) **Sample.** The number of sample units to be used for inspection of the lot.
- (f) **Sample unit.** The amount of product specified to be used for inspection. It may be:
 - (1) The entire contents of a container; or
 - (2) A portion of the contents of a container; or
 - (3) A combination of the contents of two or more containers; or
 - (4) A portion of unpackaged product.
- (g) **Unit.** The term **unit**, unless otherwise qualified, means any individual portion of an asparagus shoot three-eighths inch or more in length.
- (h) **Loose material.** **Loose material** means any loose or shattered asparagus material and cut or broken pieces that are less than three-eighths inch in length.

§52.385 Sample unit size.

Compliance with requirements for factors of quality is based on the following sample unit size for the respective style of pack:

- (a) **Spears; tips** - 50 spears or 50 tips.
- (b) **Cut spears; cuts and tips; center cuts and cuts** - 100 units.

§52.386 Size of frozen asparagus.

The size of frozen asparagus in **spears** or **tips** styles is determined by measuring the longest dimension at right angles to the longitudinal axis of the unit at the largest diameter of the unit. The word and number designations of the various sizes of frozen asparagus are shown in Table I.

Table I
Sizes of Frozen Asparagus Spears and Tips

Word designation	Number designation	Diameter in inches
Small	1	Less than 3/8 inch.
Medium	2	3/8 inch or larger but less than 5/8 inch.
Large (Jumbo)	3	5/8 inch or larger but less than 7/8 inch.
Extra Large (Colossal).	4	7/8 inch or larger.
Blend of sizes	A blend of not more than three adjacent sizes which does not meet the acceptance criteria for a single size but meets the criteria for blend of sizes (Table II and III).	
Mixture of sizes	Fails to meet the requirements of a single size or blend of sizes.	

§52.387 Size classification and compliance.

Frozen asparagus in **spears** and **tips** styles are considered as meeting the designated single size or blend of sizes, if they meet the criteria specified in Tables II and III. Defects are classified as minor, major, and severe. Each **X** mark in Table II represents **one (1) defect**.

Table II
Classification of Size Defects

Size classification	Defects	Classification		
		Minor	Major	Severe
Single sizes:				
Small	Medium size	X
	Large size	X
	Extra-Large size	X
Medium	Small size	X
	Large size	X
	Extra-Large size	X
Large	Small size	X
	Medium size	X
	Extra-Large size ...	X
Extra-Large	Small size	X
	Medium size	X
	Large size	X
Blends of sizes:				
Small/Medium Blend	Large size	X
	Extra-Large size ...	X		
Medium/Large Blend	Small size	X
	Extra-Large size ...	X		
Large/Extra-Large Blend ..	Small size	X
	Medium size	X		
Small/Medium/Large Blend	Extra-Large size ...	X
Medium/Large/Extra-Large Blend	Small size	X

Table III
Tolerances for Size Compliance

		Single Sizes			Blends of Sizes
Acceptable Quality Level (AQL)		15.0	8.0	2.5	8.0
Absolute Limit (AL) ^{1/}		15	10	5	10
Number of Sample Units	Number of Spears or Tips	^{2/} Total	Major	Severe	^{3/} Minor or Total
--- In the total sample ---					
1	50	12	7	3	7
2	100	21	13	5	13
3	150	30	18	7	18
4	200	39	22	9	22
5	250	47	27	10	27
6	300	55	32	12	32
7	350	63	36	14	36
8	400	72	41	15	41
9	450	80	45	17	45
10	500	90	50	18	50
11	550	96	54	20	54
12	600	104	59	21	59
13	650	112	63	23	63
14	700	121	68	24	68
15	750	129	72	26	72
16	800	140	76	27	76
17	850	145	81	29	81
18	900	153	85	30	85
19	950	161	90	32	90
20	1000	169	94	33	94
21	1050	177	98	35	98

^{1/} In any sample unit, when order of production is known, except the first one of 50 spears or tips.

^{2/} **Total** equals **minor**, plus **major**, plus **severe**, as applicable.

^{3/} In **Blends of Sizes**, **minor**, and **total** defects are the same.

§52.388 Grades.

- (a) **U.S. Grade A** or **U.S. Fancy** is the quality of frozen asparagus that:
- (1) is of similar varietal characteristics;
 - (2) has a good flavor and odor;
 - (3) has no grit or silt present that affects the appearance or edibility of the product;
 - (4) in which no more than 5 percent, by weight, of loose material may be present; and
 - (5) has an attractive appearance and eating quality within the limits specified for the various quality factors.
- (b) **U.S. Grade B** or **U.S. Extra Standard** is the quality of frozen asparagus that:
- (1) is of similar varietal characteristics;
 - (2) has a good flavor and odor;
 - (3) has no more than a trace of grit or silt present that slightly affects the appearance or edibility of the product;
 - (4) in which no more than 10 percent, by weight, of loose material may be present; and
 - (5) has a reasonably attractive appearance and eating quality within the limits specified for the various quality factors.
- (c) **Substandard** is the quality of frozen asparagus that fails to meet the requirements of U.S. Grade B.

§52.389 Factors of quality and grade compliance.

- (a) The grade of a lot of frozen asparagus is based on compliance with requirements for the following quality factors:
- (1) Color (Table IV);
 - (2) Uniformity of lengths (Table IV);

- (3) Character (Table V);
 - (4) Damage (Table V); and
 - (5) Harmless extraneous vegetable material (Table VI).
- (b) Defects are classified as minor, major, severe, or critical. Each **X** mark in Table IV, V, and VI represents **one (1) defect**.

Table IV
Classification of Defects
Color - Length

Quality Factors	Defects	Classification		
		Minor	Major	Severe
Color	Green or all-green spears or tips: White or yellowish-white color exceeding 1/4 inch up to 1/3 the length of the stalk	X
	White or yellowish-white color over 1/3 the length of the stalk	X
	Green-white spears or tips: White or yellowish-white color exceeding 1/3 the length of the stalk	X
	All types:			
	Cut Spears; Cuts and tips; Cuts; Center Cuts styles: White or yellowish-white; or partially of such color	X
	Spears; Tips styles: Any unit which varies more than 1-1/2 inches from the predominant length of the sample unit	X
Uniformity of length	Cut spears; Cuts and Tips; Cuts; Center Cuts styles: Any unit of cut asparagus less than 1/2 inch in length (excluding head material or loose material)	X
	Any unit of cut asparagus, more than 2 inches in length	X

Table V
Classification of Defects
Character - Damage

Quality factors	Defects	Classification		
		Minor	Major	Severe
Character . . .	Spears and Tips styles: In Grade A only - Reasonably well developed (worse than Plate 1 but not worse than Plate 2 or 3).	X
	In all grades - Poorly developed (worse than Plate 2 or 3): Seedy	X
	Flowered	X
	Cut Spears or Cuts and Tips styles: In all grades - Poorly developed (worse than Plate 2 or 3): Seedy	X
	Flowered	X
	Tough fiber development: 2 inches or less	X
	More than 2 inches or woody units of any length	X
	Shattered heads - broken or shattered to the extent that it is definitely noticeable.	X
	Misshapen - badly crooked or affected in appearance by doubles or malformations.	X
	Poorly cut - angle of cut less than 45 degrees - cut is ragged or partially cut . .	X
Damage	Discoloration, mechanical injury, pathological or damaged by other means to the extent that the appearance and eating quality of a unit is affected: Slightly	X
	Materially	X
	Seriously	X

For interpretative guides, see USDA illustrations of **Stages of Development in Frozen Asparagus**, which are a part of this document.

Table VI
Classification of Defects
Extraneous material

Quality factors	Defects	Classification			
		Minor	Major	Severe	Critical
Harmless extraneous vegetable material.	Grass, weeds, leaves, stems, and dried stalks:				
	1 inch or less	X
	More than 1 inch but not more than 2 inches	X
	More than 2 inches but not more than 3 inches	X
	More than 3 inches	X

STAGES OF DEVELOPMENT
IN
FROZEN ASPARAGUS



1.



2.

PLATE 1

**STAGES OF DEVELOPMENT
IN
FROZEN ASPARAGUS**



3.

4.

5.

6.

PLATE 2

Spears Show Lower Limit For Reasonably Well Developed Heads

**STAGES OF DEVELOPMENT
IN
FROZEN ASPARAGUS**



7.



8.



9.



10.

PLATE 3

Spears Show Lower Limit For Reasonably Well Developed Heads

Table VII
Grade Compliance - Spears and Tips - Maximum Defects Permitted

		U.S. Grade A				U.S. Grade B			
Acceptable Quality Level (AQL)		15.0	6.5	2.5	0	28.0	12.5	6.5	0.65
Absolute Limit (AL) 1/		15	8	5	0	25	13	8	2
Number of Sample Units	Number of Spears or Tips	2/ Total	Major	Severe	Critical	2/ Total	Major	Severe	Critical
- - In the total sample - -						- - In the total sample - -			
1	50	12	6	3	0	20	10	6	1
2	100	21	11	5	0	37	18	11	2
3	150	30	15	7	0	53	25	15	3
4	200	39	19	9	0	68	33	19	3
5	250	47	23	10	0	84	40	23	4
6	300	55	27	12	0	99	47	27	4
7	350	63	30	14	0	114	54	30	5
8	400	72	34	15	0	130	61	34	5
9	450	80	38	17	0	145	68	38	6
10	500	90	42	18	0	159	76	42	6
11	550	96	45	20	0	175	81	45	7
12	600	104	49	21	0	190	88	49	7
13	650	112	53	23	0	204	95	53	8
14	700	121	56	24	0	219	102	56	8
15	750	129	60	26	0	234	108	60	9
16	800	140	64	27	0	249	117	64	9
17	850	145	67	29	0	264	122	67	9
18	900	153	71	30	0	278	129	71	10
19	950	161	74	32	0	293	136	74	10
20	1000	169	78	33	0	308	142	78	11
21	1050	177	81	35	0	322	149	81	11

1/ In any sample unit, when the order of production is known, except the first one of 50 spears or tips.

2/ **Total** equals **minor** plus **major** plus **severe** plus **critical**, as applicable.

Table VIII
Grade Compliance - Cut Spears and Cuts - Maximum Defects Permitted

		U.S. Grade A				U.S. Grade B			
Acceptable Quality Level (AQL)		15.0	6.5	2.5	0	28.0	12.5	6.5	0.65
Absolute Limit (AL) 1/		25	14	7	0	44	22	14	3
Number of Sample Units	Number of Cuts	2/ Total	Major	Severe	Critical	2/ Total	Major	Severe	Critical
- - In the total sample - -						- - In the total sample - -			
1	100	21	11	5	0	37	18	11	2
2	200	39	19	9	0	68	33	19	3
3	300	55	27	12	0	99	47	27	4
4	400	72	34	15	0	130	61	34	5
5	500	90	42	18	0	160	76	42	6
6	600	104	49	21	0	190	88	49	7
7	700	121	56	24	0	219	102	56	8
8	800	140	64	27	0	249	117	64	9
9	900	153	71	30	0	278	129	71	10
10	1000	169	78	33	0	308	142	78	11
11	1100	185	85	36	0	337	156	85	12
12	1200	200	92	39	0	366	169	92	12
13	1300	216	99	42	0	396	182	99	13
14	1400	232	106	45	0	425	195	106	14
15	1500	248	113	47	0	454	209	113	15
16	1600	264	120	50	0	483	222	120	16
17	1700	279	127	53	0	512	235	127	17
18	1800	295	134	56	0	541	248	134	17
19	1900	311	141	59	0	570	261	141	18
20	2000	326	148	62	0	599	274	148	19
21	2100	342	155	64	0	628	287	155	20

1/ In any sample unit, when the order of production is known, except the first one of 100 cuts.

2/ **Total** equals **minor** plus **major** plus **severe** plus **critical**, as applicable.

§52.390 Sample size.

- (a) General.** The sample size to determine compliance with requirements for size, percent head material, and quality factors shall be the sampling plans specified in the **Regulations Governing Inspection of Processed Fruits and Vegetables and Related Products** (§52.1 - §52.83).
- (b) Acceptance numbers.** The acceptance numbers for deviants specified in the sampling plans cited in paragraph (a) of this section do not apply to these standards.

§52.391 Lot acceptance for size.

A lot of frozen asparagus is considered as meeting the requirements for a specified size if the defects permitted and the AL values for the applicable defect classifications, specified in Table III, are not exceeded.

§52.392 Lot acceptance for percent head material in the style of cut-spears.

The percent, by count, of heads is determined by averaging the percentage of heads in all of the sample units comprising the sample, **Provided**, that;

- (a)** When cut into units 1-1/4 inches or less in length no individual sample unit may contain less than 12 percent, by count, of heads; and
- (b)** When cut into units longer than 1-1/4 inches, no sample unit may contain less than 15 percent, by count, of heads.

§52.393 Lot acceptance for percent loose material.

The percent of loose material, by weight, is determined by averaging the percentages by weight of loose material in the total weight of all of the sample units comprising the sample.

§52.394 Lot acceptance for quality.

A lot of frozen asparagus is considered as meeting the quality requirements of either U.S. Grade A or U.S. Grade B if:

- (a)** The product has a good flavor and odor; and
- (b)** The product is free of grit or silt that affects the appearance or edibility within the limits specified for either U.S. Grade A or U.S. Grade B; and

- (c)** The product complies with the limits specified for loose material for either U.S. Grade A or U.S. Grade B; and
- (d)** The defects permitted and the AL values for the applicable defect classifications, specified in Table VII and VIII, are not exceeded.